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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Forest Insect Laboratory
Coeur d'Alene, Idaho

Project | Date | Author Archie L. Gibson, Assistant Entomologist

SUBJECT—

TITLE

MEMO FOR FILES RE SCREENING LODGEPOLE PINE TO PREVENT MOUNTAIN PINE BEETLE ATTACK
(March 6, 1942)

and

MEMO TO CRAIGHEAD AND WESTERN FIELD STATIONS RE STATUS OF DISCONTINUED EXPERIMENT ON SCREENING LODGEPOLE PINE TO PREVENT MOUNTAIN PINE BEETLE ATTACK
(March 17, 1942)

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LABORATORY

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Forest Insect Laboratory
Coeur d'Alene, Idaho
March 17, 1942

To: F. C. Craighead and Western Field Stations

From: Archie L. Gibson, Coeur d'Alene Forest Insect Laboratory

Subject: Status of Discontinued Experiment on Screening Lodgepole Pine to Prevent Mountain Pine Beetle Attack

In 1939 a station memorandum was sent to the above agencies stating the progress made in the experiment of screening the basal portion of lodgepole pine to prevent mountain pine beetle attack. The succeeding notes bring the data and conclusions up to date.

None of the 87 lodgepole pine screened on the three areas since the inception of the project in 1933 have been killed by the mountain pine beetle. The writer is convinced that one tree, showing 25 attacks above the screen, would have been "filled-in" and killed by the insects had the basal portion not been screened. On the Targhee Forest, where 27 trees were screened in 1935, 41 trees were attacked among and near the screened trees between 1935 and 1939. In the normal invasion of an area by a mountain pine beetle infestation, it is highly improbable that so many trees would have been attacked by the insects without selecting some of the screened ones, had the latter not been protected. To a lesser extent the same thing has occurred on the other two areas.

At the time the plots were established it was thought the mountain pine beetle might destroy all the mature timber on two of the areas. Had that occurred, leaving only the screened trees, the effectiveness of the method would have been clearly demonstrated, but decline of the outbreaks before that stage was reached leaves us in doubt if protection would be afforded under the severest epidemic conditions. However, on the basis of results up to the present time, the method can be recommended as protecting lodgepole pine from mountain pine beetle attacks except possibly under the severest conditions.

Because of the high cost of protecting trees by this means, compared to the timber values involved, the screen can only be placed on trees of high aesthetic value.

Decrease or complete cessation of mountain pine beetle activity on the three plots has terminated their usefulness, but when conditions permit, the method will be given the more severe test mentioned in the preceding discussion.

/s/ Archie L. Gibson

Copies sent:
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3/6/42

MEMORANDUM FOR FILES

Re: Screening Lodgepole Pine to Prevent Mountain Pine Beetle Attack

Studies of the habits of the mountain pine beetle revealed that in mature lodgepole pine initial attacks usually took place at from three to ten feet above the ground, with subsequent "fill-in" spreading above and below that point. It was believed initial attack on this limited portion of the tree was due to preference of the insect and that if this ~~preferred~~ area was made inaccessible to the bark beetles, they might not attack the tree at all. Accordingly various chemical mixtures and mechanical barriers were ~~placed~~ tested on this preferred portion, but none of the former showed acceptable repellent effect and only screening ~~showed~~ gave promise of effectiveness. of the latter

RESULTS OF EXPERIMENTS FROM 1933 to 1941

It was fully realized when this series of tests were begun that forest timber was too low in value to warrant expensive protection and that screening would be limited to trees of high aesthetic value.

The initial test was begun in 1933, when nine trees near Elkhorn Hot Springs (on the Beaverhead National Forest) were screened. Attacks were just starting on two of these trees ~~when~~ at the time they were screened and were selected for that reason. It was felt that the element of chance immunity was eliminated if the trees selected were already being ~~shown to be preferred host~~ attacked as that indicated they were material ~~by being attacked by the insects~~. Screening prevented any further attacks on these two trees and none of the other seven were attacked. The apparent protection afforded these nine trees prompted expansion of the program, and in 1934 25 more trees, at the

Elkhorn Hot Springs resort, ~~on the Beaverhead National Forest~~ were screened. Although some unprotected trees among those screened were attacked by the bark beetles, a decided decrease in the mountain pine beetle infestation on the Beaverhead National Forest prevented a conclusive test in that region. For that reason an additional 27 trees were screened in 1935 on the Targhee Forest, where an aggressive outbreak of the same insect had been causing heavy losses in lodgepole pine for a number of years.

Annual examinations revealed some losses of screened trees on the Beaverhead Forest. Contraction of the screen, probably during periods of severe cold, and swaying of the tree had apparently ~~caused~~ combined to loosen the screen enough on ~~the screen to be pulled loose from the base of~~ one tree, to expose the base ~~exposing it~~ to a light mountain pine beetle attack and "fill-in" by secondary bark beetles both ~~above and~~ and above under the screen. A second tree died from some other cause than bark beetle attack, and a third in 1937 from attacks of secondary bark beetles. ~~The~~ This third tree had probably been weakened by road fill piled against it, and tiny secondary bark beetles had either taken advantage of a few small openings which developed in the screen around a cat-faced area, or had been able to enter through the comparatively coarse (14-mesh to the inch) screen. An unusual feature was the finding of larvae of some of the larger wood borers under part of the screen, where it had been drawn tightly against the bark. As there was insufficient room ~~under the~~ between bark and screen at that point for movement of any but the tiny secondary bark beetles, the only conclusion I can draw is that the parent beetles oviposited through the screen. Other trees on the Elkhorn area had been attacked above or below the screen

by from one to five beetles, all of which had been"pitched out". One missing screened tree on the same area was reported to have been windthrown and salvaged for fuel. In 1939 four of the original 9 trees screened were robbed of their screen, one tree being felled to facilitate removal. However, as mountain pine beetle activity (had decreased to the point where it was negligible in that vicinity, the loss of these trees was not a serious one to the experiment.

Complete cessation of mountain pine beetle activity (in the last year) in the vicinity of the Elkhorn resort brought the necessity for protection of the screen to a close and it was removed in 1941.

In 1935, shortly after the 27 trees had been screened on the Targhee Forest, the protection afforded them was indicated by the attack of nine unscreened trees among those screened and an additional 20 attacked nearby. In 1936 one more unprotected tree was heavily attacked and three "fill-ins" of others that had been lightly attacked in 1935 occurred close to the screened trees. Several of the protected trees received from one to five attacks above the screen during these two years, but as similar attacks occur on unscreened trees, without subsequent "fill-in", no definite conclusion, that protection from further attack was afforded by the screen, can be drawn. However, in 1937 definite evidence was obtained when 25 attacks above the screen on one tree were "pitched out." Judging from observation of what has occufred on unprotected lodgepole pine, it is believed this tree would have been heavily attacked and killed had it not been for the screen. Within 50 feet of the above tree five other unscreened trees were heavily attacked and killed. No attacks were noted on the remaining 26 screened trees during 1937 . No bark beetle activity was noted in or

near the screened trees in 1938, but in 1939 three were lightly attacked within 75 feet of the protected group. In 1940 three trees were found to have had the screen partly torn from them by a tree felled by wood cutters. Sufficient damage had occurred to screen and cambium to invite bark beetle attack, but as ~~none~~ no bark beetles were noted within two chains of the protected trees and few in the general area, chances of attack were almost negligible. The almost complete cessation of bark beetle activity in the area terminated the experiment on that area in 1940. Removal of the screen from the trees is recommended.

Because of the decrease in mountain pine beetle infestation on the Targhee and the desire to still further test the method, 26 trees were screened at the Grand Teton Park headquarters in 1938. These trees adjoined the Windy Point area, where an active infestation of the mountain pine beetle was present. No attacks occurred on the screened trees in 1938 or 1939, but two trees within one hundred feet "pitched-out" light attacks and four others more heavily hit were noted from two hundred to four hundred feet fistant. In 1940 two trees two chains west of the screened trees were killed. The first screened tree to be lost of ~~this group~~ those screened was in 1941, when a tree, apparently weakened by road construction within a few feet of it, was invaded and killed by secondary bark beetles, which attacked the tree above the screen.

It is believed protection of the trees at Grand Teton Park is no longer necessary due to the decided decrease in mountain pine beetle activity in the area. As these trees are of high aesthetic value,

it is suggested that the screen be removed because it may be considered unsightly to some of the many tourists visiting the area.

IMPROVEMENTS IN APPLYING SCREEN

It was found that lathe nails were unsatisfactory for holding the lathe that joined the edges of the screen envelope on the tree. These nails would work loose and allow openings to occur, exposing the portion of the tree needing protection to bark beetle attack. What is known in the hardware trade as the cement-coated nail was much superior because of better holding quality. The roughened roofing nail was also superior to shingle nails in holding ability, but split some lathe because of its larger diameter.

The fastening of the screen envelope around the tree at its upper end was found to be done most satisfactorily by means of a screen-door spring and wire. The spring was drawn around the tree with only sufficient tension to hold the screen tight to the bark, and held there by wire fastened to the two ends of the spring, the wire in turn being held in place by one or two small nails fastening both the wire and screen to the tree. The screen-door spring permitted diameter growth without periodic loosening to prevent girdling the tree, found to be necessary where only wire was used.

DISCUSSION OF THE METHOD

Before the method can be recommended without qualification, more severe tests are considered necessary by the writer. However, none of the 87 trees on which the screen has remained intact have been killed by the mountain pine beetle. Furthermore, in one case the

writer is convinced that but for the protection afforded by the screen, the tree would have been killed. Because of the numerous trees killed among the protected trees, the indications are that the screen affords protection. It seems unlikely that 47 trees could have been attacked near and among the screened trees without some of the latter being killed if the screen hadn't given immunity. Therefore, the writer believes we are amply justified in believing at least some measure of protection from mountain pine beetle attack is afforded (lodgepole pine) trees by screening the basal portion.

It is planned to give the method a more severe test as soon as the proper conditions are found. If possible, both lodgepole pine and whitebark pine will be screened in the hopes that the method will afford protection to both timber species.